What is claimed is:

1. A process for producing powder coating materials, comprising the following steps:
   - preparing a polyaddition resin melt using a Taylor reactor (1) at a temperature above the melting temperature of the polyaddition resin;
   - supplying the polyaddition resin melt to a homogenizing means (16);
   - adding a crosslinker to the homogenizing means (16) to prepare a components melt;
   - cooling the components melt on a cooling means (20) for solidification to the end product;
   - supplying the end product to a pulverizing means P.

2. The process as claimed in claim 1, wherein the polyaddition resin melt is devolatilized before its entry into the homogenization means (16).

3. The process as claimed in claim 1 or 2, wherein the crosslinker is added in powder or liquid melt form.

4. The process as claimed in any of claims 1 to 3, wherein the crosslinker is supplied in parallel with the polyaddition resin melt to the

homogenizing means (16).

5. The process as claimed in any of claims 1 to 3, wherein the crosslinker is supplied to the polyaddition resin melt via a side strand of the homogenizing means.

6. The process as claimed in any of claims 1 to 5, wherein homogenization takes place statically.

7. The process as claimed in any of claims 1 to 5, wherein homogenization takes place dynamically.

8. The process as claimed in any of claims 1 to 7, wherein additives are supplied to the crosslinker an/or to the polyaddition resin melt.

9. The process as claimed in any of claims 1 to 8, wherein the polyaddition resins are polyurethanes, polyepoxides or addition (co)polymers of olefinically unsaturated monomers.

10. Apparatus for implementing a process as claimed in any of claims 1 to 9,

having a Taylor reactor (1) with an inlet region (8) for supplying the process materials to prepare a polyaddition resin melt and having an outlet (10) for delivering the polyaddition resin melt,

having a homogenizing means (16) which comprises at least one first and second inlet for supplying the polyaddition resin melt delivered by the Taylor reactor, and the crosslinker, and also comprising an outlet via which a product can be delivered by the homogenizing means (16).

11. The apparatus as claimed in claim 10, wherein a devolatilizing means (13) is interposed in the supply line from the Taylor reactor (1) to the homogenizing means (16).

12. The apparatus as claimed in claim 11, wherein the homogenizing means (16) is an extruder having at least two feed openings.

13. The apparatus as claimed in claim 10 or 11, wherein the homogenizing means (16) is a devolatilizing extruder having at least two feed openings.

14. The apparatus as claimed in claim 11, wherein the homogenizing means (16) is a static mixer.

15. The apparatus as claimed in any of claims 11 to 14, wherein the devolatilizing means comprises a letdown vessel.

16. The apparatus as claimed in claim 15, wherein

there is a pressure maintenance valve (11) upstream of the letdown vessel (13).

17. The apparatus as claimed in any of claims 10 to 16, wherein means for adding at least one additive to the Taylor reactor (1) and/or to the homogenizing means (16) are provided.

18. The apparatus as claimed in any of claims 10 to 17, wherein the Taylor reactor (1) has a toroidal reaction volume (2) which opens to an outlet region (9).

19. The apparatus as claimed in claim 18, wherein the Taylor reactor (1) comprises a rotor (4) which is mounted rotatably at one of its end faces.

20. The apparatus as claimed in any of claims 10 to 19, wherein the inlet range (8) is provided in the narrowest region of the reaction volume (2) of the Taylor reactor (1).

21. The apparatus as claimed in any of claims 10 to 20, wherein the outlet region (9) is provided above the unmounted end (4.2) of the rotor (4).

22. The apparatus as claimed in any of claims 10 to 21, wherein the reactor housing, reactor wall (3) and/or rotor (4) is or are configured in such a

way that the cross section of the toroidal reaction volume (2) from the inlet region (8) to the outlet region (9) increases initially but at least over part of the length of the rotor (4) the cross-sectional increase does not grow larger.

23. The apparatus as claimed in claim 21, wherein the outlet region (9) broadens or stays the same beyond the reaction volume (2) in the direction of flow traversal and subsequently tapers to a product outlet (10).

24. The apparatus as claimed in any of claims 10 to 23, wherein the greatest diameter of the product outlet (10) follows the outlet region (9) and said product outlet (10) tapers in the direction of flow traversal.